Environmental Protection Agency

Horiba Emission Analysis System
CO_2 Interference Procedure

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NVFEL Reference Number

010A

Implementation Approval

Original Procedure Authorized by EPCN #232 on 12-25-98

Revision Description

(1) 09-18-2001 The purpose of this change is to update the Group Responsible name per EPCN #316

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Figures

1. Purpose

The purpose of this working practice is to describe the equipment and procedure required to perform a CO_2 Interference Check on the Horiba, Mexa-7000, Automotive Emission Analysis System. The practice shall be performed at six month intervals.

The following additional equipment is required:

Portable CO_2 interference kit with flex line

Container of distilled water and a funnel

2. Test Procedure

100 Open the cylinder valve on the $C0_2$ bottle and ensure it is set at 14 pounds per square inch (psi).

101 At the rear of the Solenoid Valve Unit (SVS) of the analyzer under test, verify that the water bubbler reservoir water level is between the blue lines.

If necessary, remove the reservoir cap and add sufficient water. See Figure 1.

Figure 1
Water Bubbler

102 Connect the flexible quick-disconnect jumper lines between the portable CO_2 interference kit CO bottle and the Solenoid Valve Unit (SVS) bottle disconnect of the bench under test.

Note the value of the bottle concentration on the cylinder tag.

103 Activate the Horiba Series 7000 Bench according to WP 006, "Horiba Bench Startup."

Additional information is available in the Horiba "Series 7000 Users Guide."

104 From the Main Control Unit (MCU) "Command Screen," Click on the Horiba logo button in the title bar.

From menu items that appear below the button, click on "User Level."

If "Supervisor" is not the top menu item in the display window, click on "Supervisor."

Use the mouse and on-screen keyboard, see Figure 2, to click on "S", "U", "P", "E", "R", then click on "Enter". "Supervisor" will appear at the top-center of the screen in the blue area.

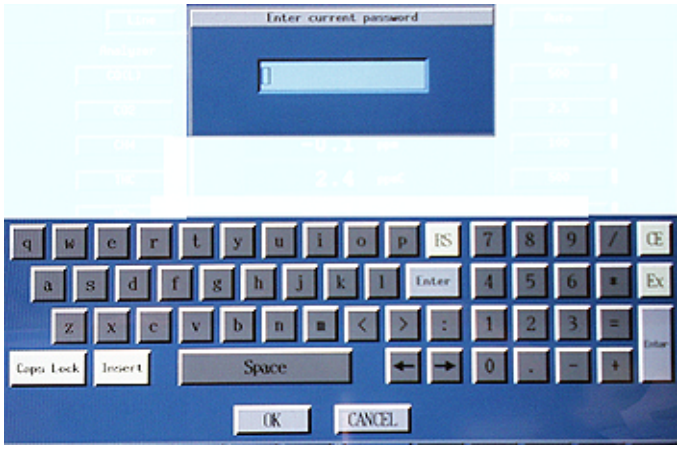

Figure 2
On-Screen Keyboard

105 On the display setup portion of the screen, click on the “Menu” button. See arrow in Figure 3. From the menu items that appear, click on “Utility” (see circle in Figure 3) and the “Utility” screen will appear.

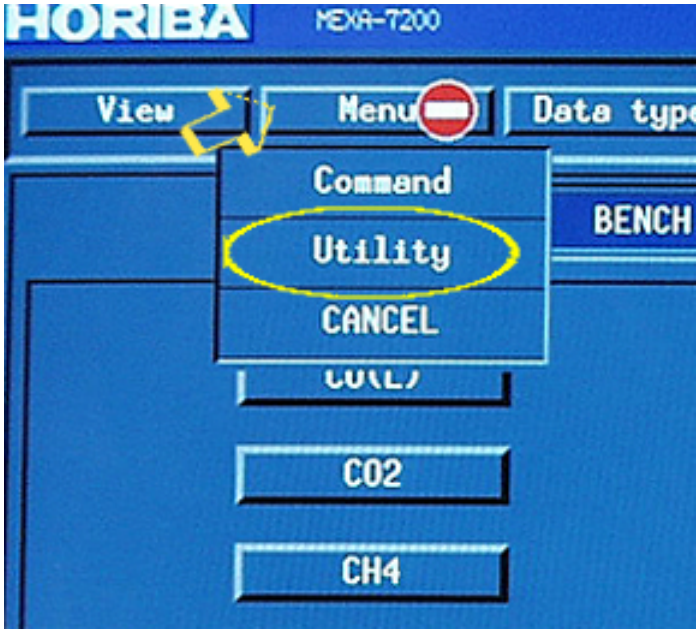

Figure 3
Click on “Utility”

106 Click on the “Checks/Tests” button in the command area of the screen. See arrow in Figure 4. From the menu items that appear above the button, click on “Interference Check.” See the circle in Figure 4.

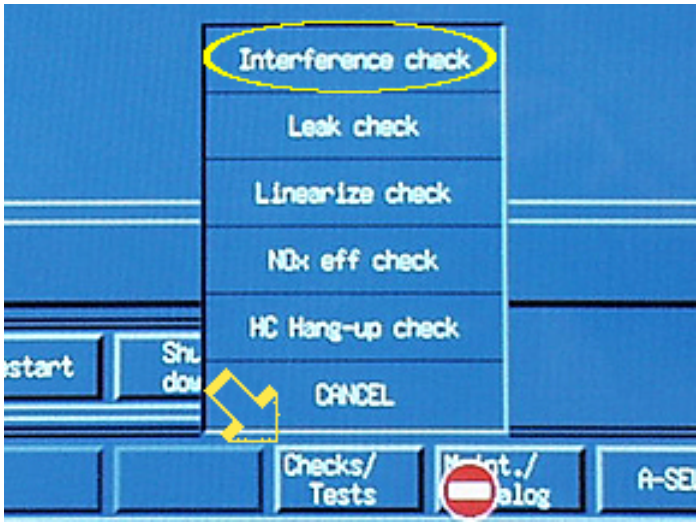

Figure 4
Check/Test Button

107 The “Interference Check” sub-panel will appear. If the bench to be used for testing is not selected on the sub-panel, click on the “Line” button. See arrow in Figure 5. From the menu items that appear, click on the appropriate analyzer bench. See circle in Figure 5.

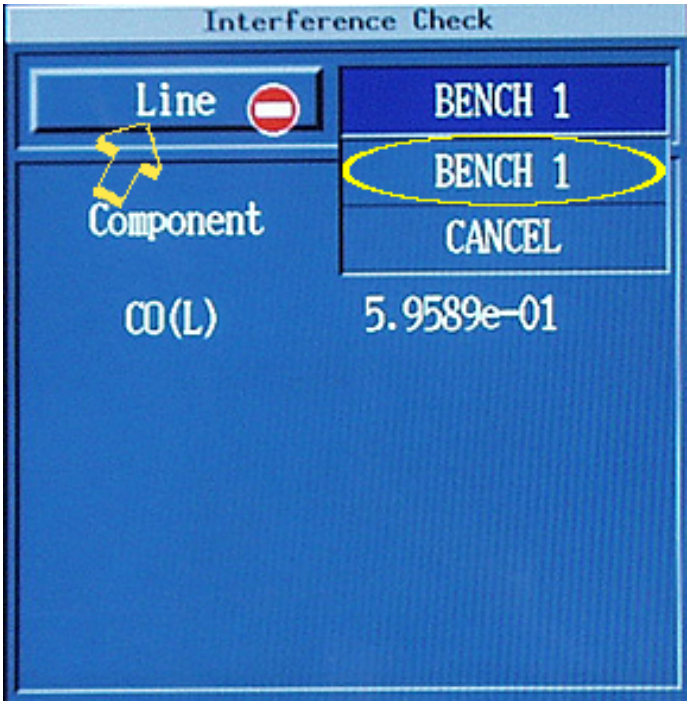

Figure 5
Bench

108 Click on “CO_2 Configuration” button. See Figure 7.

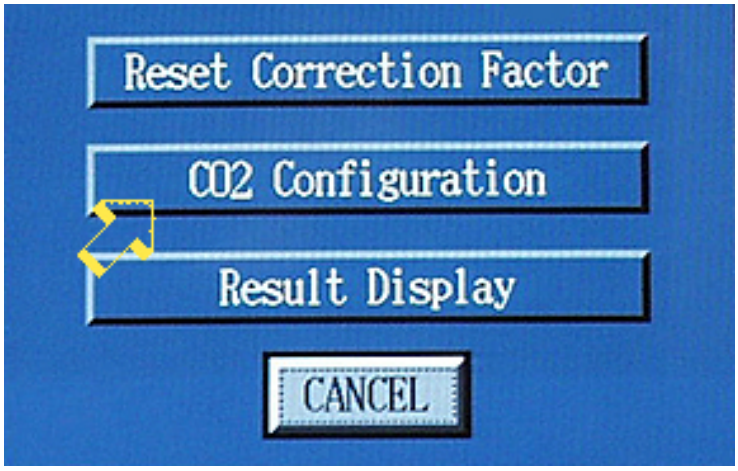

Figure 6
CO_2 Configuration Button

109 The "$C0_2$ Interference Check Config" screen will appear. See Figure 7. Verify the following:

Limits for Line: ..... Appropriate Bench Number

Min% full scale 0.00

Max% full scale 1.0

FS/PPM Cutoff 300

Min PPM ..... -3

Max PPM 1

If an item needs correction, click in the field and use the on-screen keypad to enter the correct value. When done, click on "OK" on the keypad.

Click on "OK" from the "$C0_2$ Interference Check Config" screen.

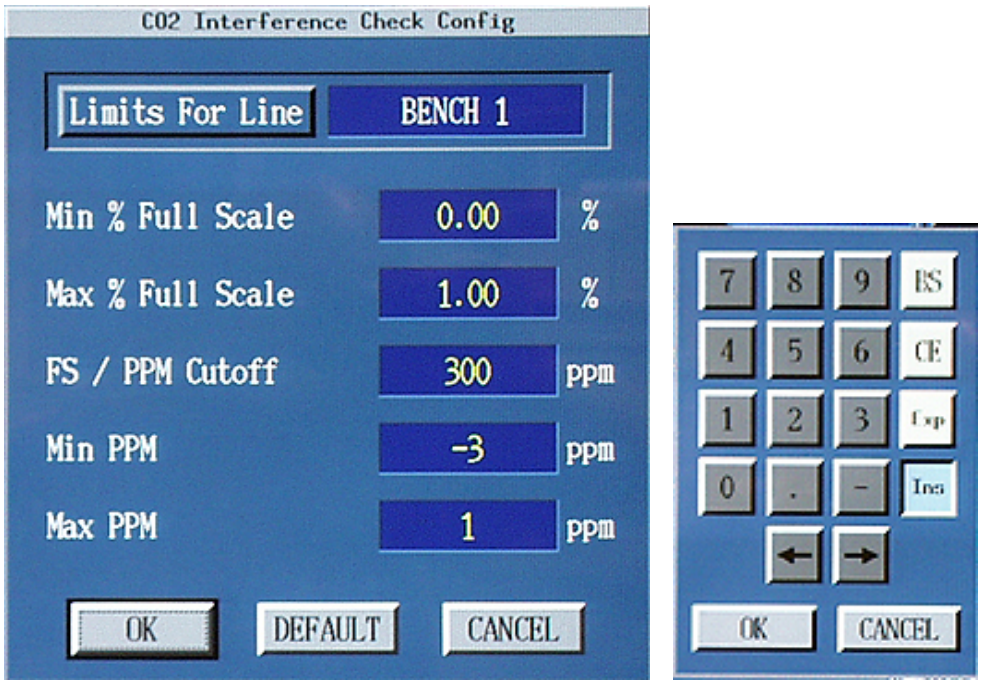

Figure 7
$C0_2$ Interference Check Config Screen and On Screen Key Pad

110 When "Interference Check" screen appears, click on the “Reset Correction Factor” button. See Figure 8.

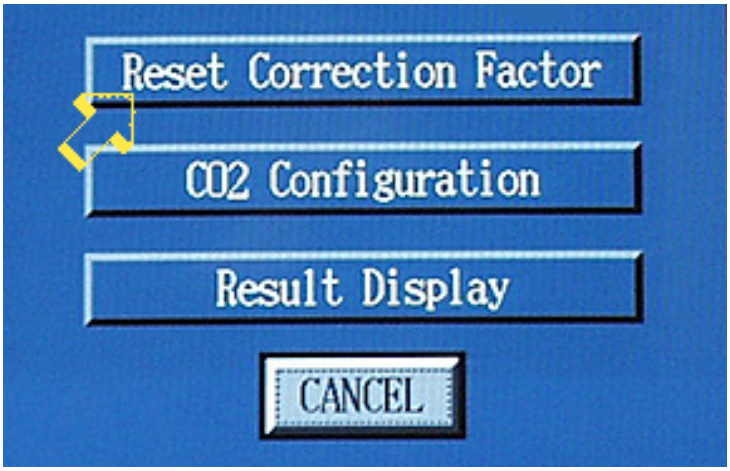

Figure 8
Reset Correction Factor

111 The “Interference Check Result Reset” subpanel will appear, click on the “Component” button. See the arrow in Figure 9.

From menu items that appear below the button, click on “CO(L).”
See the circle in Figure 9.

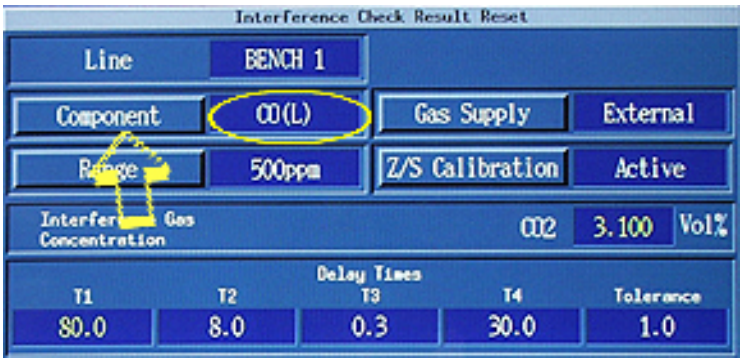

Figure 9
C0(L)

112 Click on the "Z/S Calibration" button. See the arrow in Figure 10. From menu items that appear below the button, click on "Active." See the circle in Figure 10.

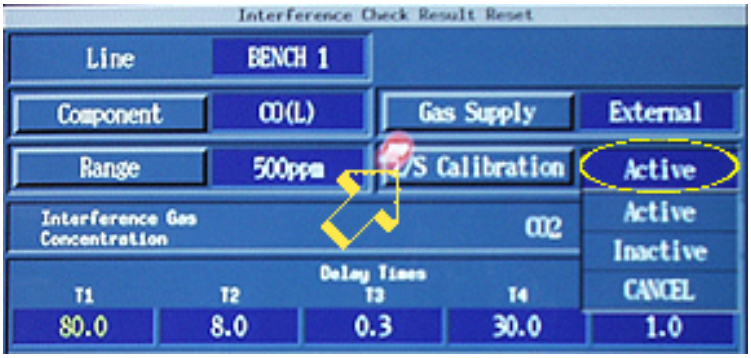

Figure 10
Z/S Calibration

113 Verify that the field to the right of the "Range" button contains the appropriate range. If not, click on the "Range" button (see the arrow in Figure 11) and from menu items that appear below the button, click on the appropriate range. See the circle in Figure 11.

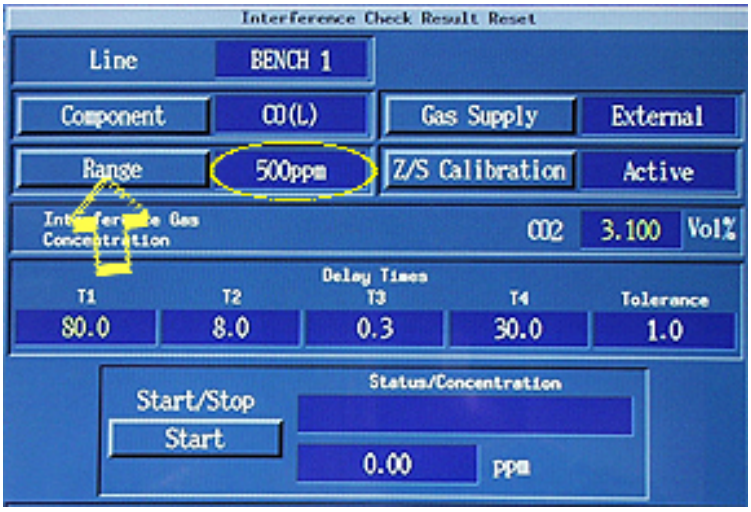

Figure 11
Range

114 Verify that the field to the right of the “Gas Supply” button contains “External.” If not, click on the “Gas Supply” button (see Figure 12) and from menu items that appear below the button, click on “External.” See the circle in Figure 12.

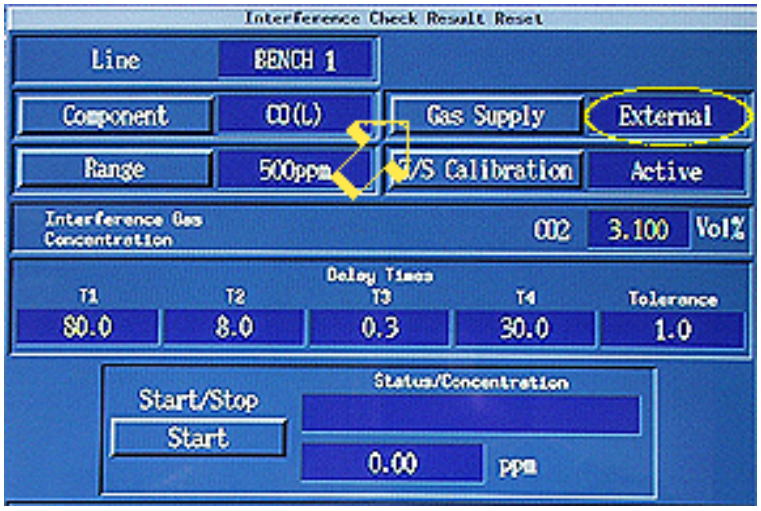

Figure 12
External

115 Click in the yellow user changeable field for “CO2.” Use the on-screen keypad to enter “CE” and to enter the value noted in Step 102. See Figure 13. On the keypad, click on “OK.”

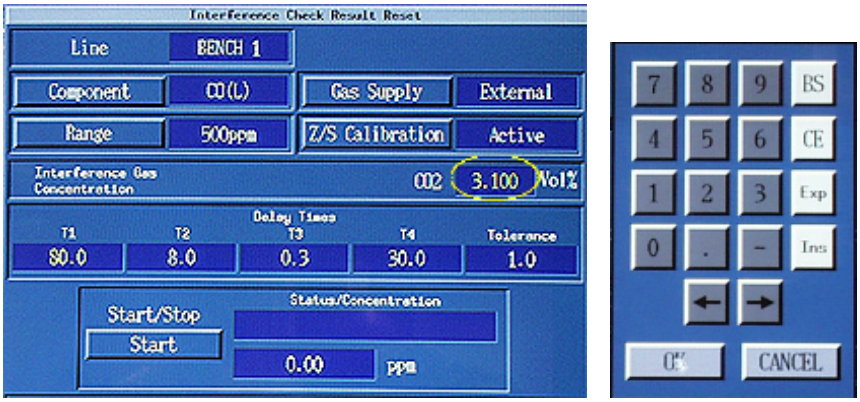

Figure 13
C02

116 Verify that the field under “T1” contains “80.” See the circle in Figure 14. If not, click in the yellow user changeable field under “T1” and use the on-screen keypad, See Figure X, to enter “80.” Click on “OK.”

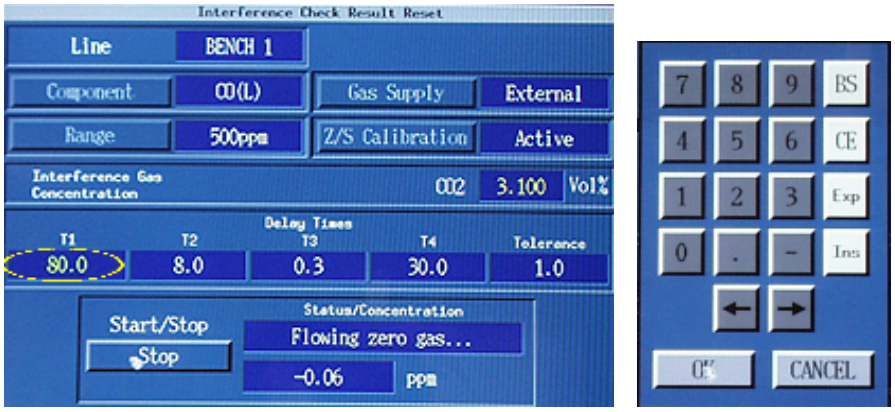

Figure 14
T1

117 Click on the “Start/Stop” button See Figure 15.

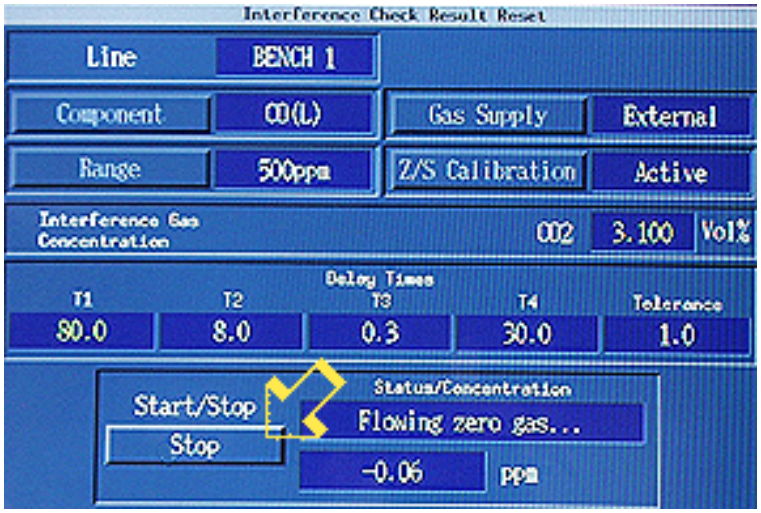

Figure 15
Start/Stop

118 The “Analyzer Calibration” screen will appear, See Figure 16. When completed, “Calibration successfully completed” will appear. Click on “OK.” The "Interference Check Result Reset" panel will appear. If “Calibration Failed” appears, the process was not successful.

Figure 16
Analyzer Calibration

119 During the test the following status indications will be sequentially displayed in the “Status/Concentration” window. See Figure 17. Flowing Zero Gas, Reading Zero, Flowing Interference Gas, Measuring, Purging with Zero Gas, End

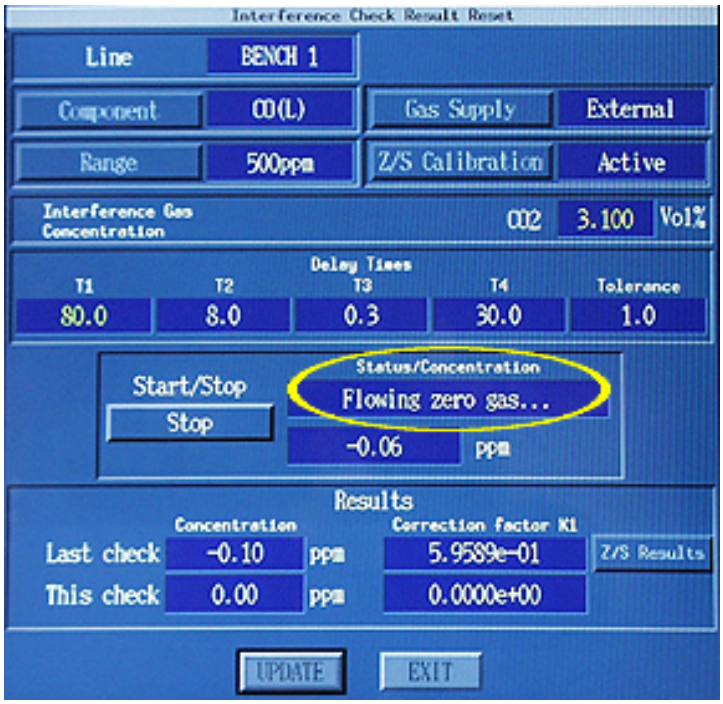

Figure 17
Status/Concentration

120 The value that automatically appears in the “This check” field under “Results” and it must be within -3.0 to 1.0 PPM, see The circle in Figure 18. If the value is not within acceptable limits, repeat Step 117 for no more than 3 times. If after 3 retries the value is not within the acceptable limits, notify a PNGV senior technician and wait for instructions before proceeding.

Click on “Update”, see the arrow in Figure 18.

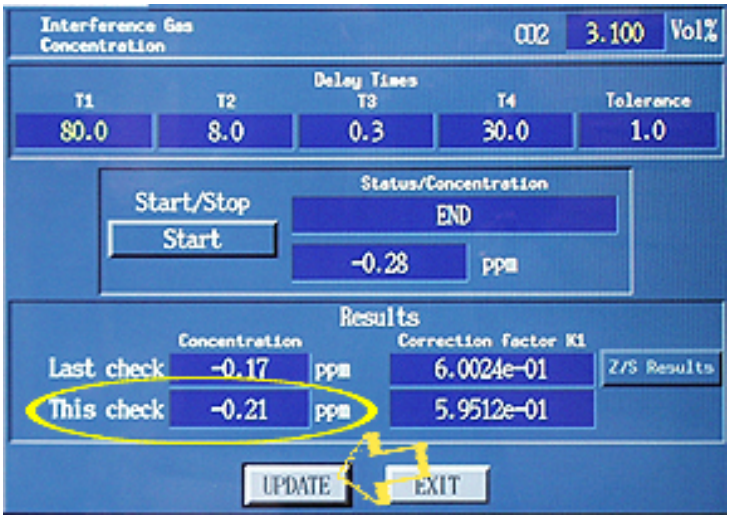

Figure 18
Results

121 Click on “Result Display”, see Figure 19.

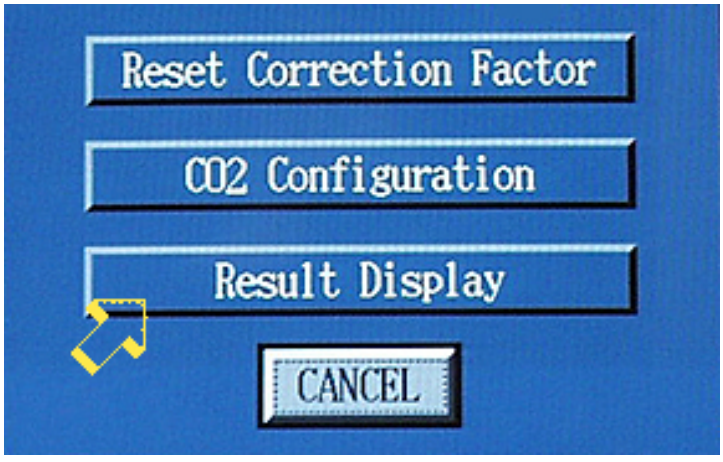

Figure 19
Result Display

122 The “Interference Check Results” subpanel will appear. See Figure 20.

Figure 20
Cancel

123 Click on the Horiba logo button in the title bar. See the arrow in Figure 21. From the menu items that appear below the button, click on “Hardcopy.” See the circle in Figure 21.

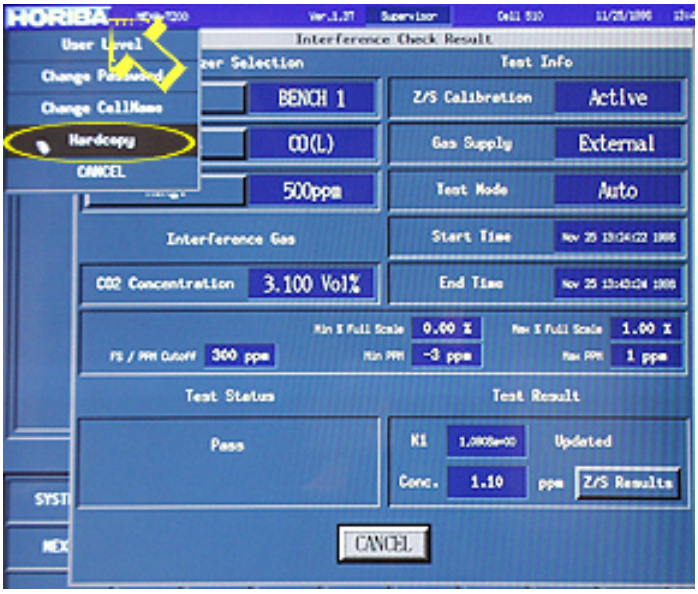

Figure 21
Hardcopy

124 From menu items that appears, click on “Sub-panel”, see Figure 22.

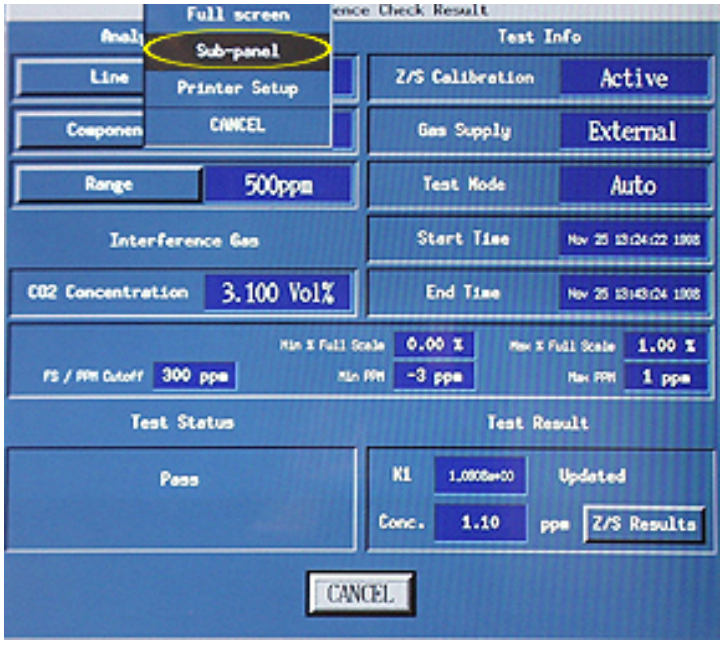

Figure 22
Sub-panel

125 Click anywhere inside the “Interference Check Results” subpanel. The “Interference Check” subpanel will automatically display and a hardcopy of the test results will print on the control room printer. Click on “Cancel.” File the print-out in the diagnostics file for the test site.

126 The “Utility” screen will appear. Click on the “CO(L)” button. See the arrow in Figure 23. From menu items that appear below the button, click on “Cal.” See the circle in Figure 23.

Figure 23
"Utility" Screen

127 An automatic zero and span calibration check of the analyzer will occur. The indicator flashes "Z" during zero and "S" during span. See Figure 24.

If the "Concentration" window displays "Over" in red letters, repeat this step once. If the "Concentration" window displays "Over" again, notify a PNGV senior technician and wait for instructions before proceeding.

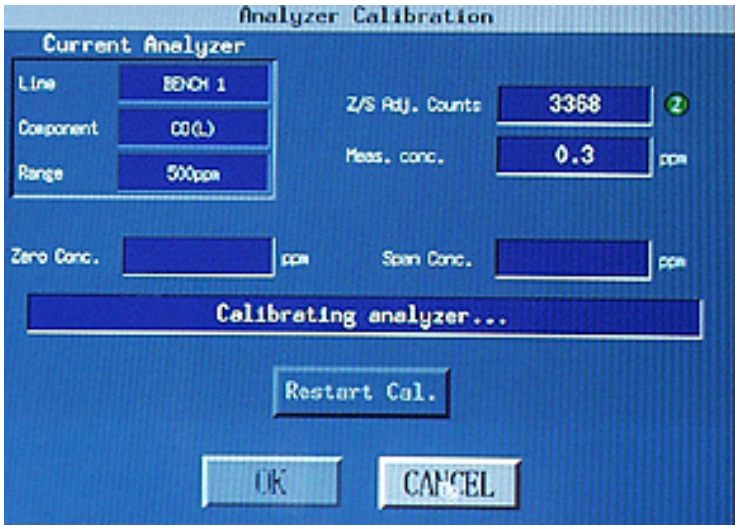

Figure 24
Calibration

128 Click on the "Horiba" button in the upper left corner of the screen, see Figure the arrow in 25. From the menu items that appear, click on "User Level." See the circle in Figure 25.

Figure 25
User Level

129 From the menu items, click on “Normal.” See Figure 26.

Figure 26
Normal

3. Acceptance Criteria

3.1 The $C0_2$ bottle must be set at 14 pounds per square inch.

3.2 The water bubbler reservoir water level must be between the blue lines.

3.3 The “Limits for Line: button:” must be:

Min% full scale 0.00
Max% full scale..... 1.0
FS/PPM Cutoff..... 300
Min PPM ..... -3
Max PPM 1

3.4 The results of the CO_2 Interference test must be within -3.0 to 1.0 PPM. If not within acceptable limits, the test is not repeated more than 3 times.

3.5 The “Concentration” window must not display the word “Over.”